
Cell polarity and spindle orientation in the distal epithelium of embryonic lung.

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Public Summary:

Scientific Abstract:

A proper balance between self-renewal and differentiation of lung-specific progenitors at the distal epithelial tips is absolutely required for normal lung morphogenesis. Cell polarity and mitotic spindle orientation play a critical role in the self-renewal/differentiation of epithelial cells and can impact normal physiological processes, including epithelial tissue branching and differentiation. Therefore, understanding the behavior of lung distal epithelial progenitors could identify innovative solutions to restoring normal lung morphogenesis. Yet little is known about cell polarity, spindle orientation, and segregation of cell fate determinant in the embryonic lung epithelium, which contains progenitor cells. Herein, we provide the first evidence that embryonic lung distal epithelium is polarized and highly mitotic with characteristic perpendicular cell divisions. Consistent with these findings, mInsc, LGN, and NuMA polarity proteins, which control spindle orientation, are asymmetrically localized in mitotic distal epithelial progenitors of embryonic lungs. Furthermore, the cell fate determinant Numb is asymmetrically distributed at the apical side of distal epithelial progenitors and segregated to one daughter cell in most mitotic cells. These findings provide evidence for polarity in distal epithelial progenitors of embryonic lungs and provide a framework for future translationally oriented studies in this area.

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